

# **Hospital Performance in Rhode Island**

## **How Often Our Hospitals Provide Recommended Care for Heart Attack, Heart Failure, and Pneumonia.**

Technical Report

Rhode Island Department of Health  
November 2002

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## **Background**

### ***Rhode Island Public Reporting Program for Health Care Services***

In 1998, the State of Rhode Island passed legislation to require public reporting of quality of care for all providers in settings of care licensed by the Department of Health (HEALTH). A similar effort in the State was defeated in 1993. State Senator Charles Fogarty (now the Lieutenant Governor), who was recognized statewide for his interest and commitment to the delivery of quality health care, initiated and led the effort in 1998. Senator Fogarty's strategy to develop support for the concept was to include all of the key stakeholders in the identification of the principal points to be covered in the legislation. These stakeholders included provider groups (hospitals, nursing homes, home health care agencies), physician groups, consumer groups, business, legislators, and state government. Their input was considered and incorporated as appropriate. This participatory process also offered the opportunity to discuss the benefits and concerns that groups or individuals had regarding the purpose and provisions of the proposed bill, as well as to generate support for its passage. The key concerns included representation of the various constituencies in the implementation of the law, and that the purpose of the law includes both public reporting and quality improvement.

The law (R23-17-17-1(4) ) was passed by unanimous vote in July of 1998. The strong support it received can be attributed to the leadership of Senator Fogarty and the participatory approach he used in the drafting of the bill; the providers' recognition of their responsibility to report to the public; and the consumers' increasingly vocal support for a public reporting program.

The law has two aims: to provide public reporting related to patient satisfaction and the quality of clinical services delivered by providers; and to stimulate ongoing quality improvement efforts by the providers. It is broad in scope in that it requires public reporting by hospitals, nursing homes, home health care agencies, and other licensed health care facilities as determined by the Director of Health.

HEALTH was designated as the state agency to implement the legislation. The Director of HEALTH, Patricia Nolan, MD, MPH, serves as the chair of the Steering Committee established as part of the legislation to oversee its implementation. This seventeen member committee includes representatives of the legislature, key provider and practitioner constituencies (hospitals, physicians, nurses, skilled nursing facilities), business, consumers, insurance, related government agencies (HEALTH, Human Services [Medicaid], and Elderly Affairs). The Steering Committee was expanded by legislative amendment in 2000 to include two members at large. The Centers for Medicare & Medicaid Services (CMS) and the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) were invited to fill those seats. This action formally recognized the collaboration that had developed among the three parties since the passage of the legislation in 1998. This collaboration is discussed in detail below.

The purpose of the Steering Committee is to oversee the implementation of the legislation. It is responsible for the key decisions in the process (i.e., what to report, how

to report it, when, etc.). The Committee is assisted by a technical expert working subcommittee called the Measures Subcommittee. The Subcommittee includes members representing the providers, academia, expert consultants, and consumers. The Subcommittee has subdivided its work into several workgroups: hospital patient satisfaction, hospital clinical measures, nursing home measures, etc. These workgroups conduct the research into the topic areas, develop the measures and report formats, i.e., they do the detail work that the Subcommittee reviews prior to the Steering Committee final consideration of the work products of the legislation.

Related to the development of the hospital measures (patient satisfaction and clinical quality), three key groups were identified to work together to make it successful: HEALTH, the Hospital Association of Rhode Island (HARI), and Qualidigm/Rhode Island Quality Partners (RIQP). They have the following roles and responsibilities:

- HEALTH has the ultimate responsibility for design and production of a credible, efficient and cost effective public reporting program and for the leadership and coordination of activities to achieve it.
- HARI is the prime facilitator for the hospitals in regards to the investigation and presentation of an adequate, cost-effective approach to meet the law requirements placed upon providers and participates in the coordination of hospital input for reporting products.
- Qualidigm/RIQP provide clinical, technical and research expertise to assist both HEALTH and HARI in these efforts.

In addition, all three parties work together to support the hospitals' initiatives to improve quality of care based on performance measurement identification of opportunities for improvement.

HEALTH, HARI and Qualidigm/RIQP recognized that implementation of the state law would be challenging and costly, both to the state and the providers. To have a state the size of Rhode Island conduct the research and piloting of measures sets suitable for reporting, as well as develop the report formats, would require technical expertise, sizable funding and time. The Rhode Island approach, therefore, was a very pragmatic one: research similar efforts and partner with them when appropriate.

### ***Performance Measurement – National Scene***

The JCAHO ORYX® initiative was under development at the point in time when Rhode Island was gearing up to implement the State law. Therefore, JCAHO was invited by HEALTH and HARI to discuss the ORYX® initiative with them. Qualidigm/RIQP also participated in those discussions. The discussions led to the recognition that ORYX® measures could meet the requirements of hospital reporting for clinical quality. Shortly thereafter, JCAHO announced that a pilot for the ORYX® system would be conducted in five states. On behalf of the hospitals in Rhode Island, HARI applied for and was chosen to become one of the pilot states. This meant that the hospitals would only have to collect one set of data to satisfy both JCAHO and the State law, thereby reducing the data collection burden on them. It also precluded any potential confusion for the hospitals and

the public, if measures reported by each entity, JCAHO and the State, were similar but not exactly the same.

Within three months of the initial discussions among JCAHO, HEALTH, HARI, and Qualidigm/RIQP, Marcia Petrillo, CEO of Qualidigm, learned about the CMS National Performance Measurement Strategy. She recognized the similarity of purpose among all of the entities and approached CMS to consider some form of participation in the Rhode Island effort. CMS and Qualidigm/RIQP held discussions with HEALTH to elicit their level of interest in some form of partnership. These discussions were extended to include HARI and JCAHO. It was agreed among all parties that a partnership would be of value to each party.

The CMS Hospital Core Performance Measurement Project (HCPM) was the result of that agreement. It is an example of a creative partnership that would benefit both a local entity as well as two national programs with the same purpose: promoting quality improvement and public accountability. Each entity had needs that could efficiently and cost effectively be met through collaboration. CMS had made a commitment to public accountability and reporting; JCAHO wanted to explore an opportunity for improving its accreditation program through a refinement of its ORYX® program; and Rhode Island needed to implement State legislation calling for public reporting and the promotion of quality improvement.

The purpose of the HCPM project was to:

- Develop a hospital core quality measurement set for use by CMS (then HCFA), at the national level for hospital accountability and public reporting, and
- Promote the use of standardized measurement specification, collection, verification and audit tools, and analytical tools for quality measurement.

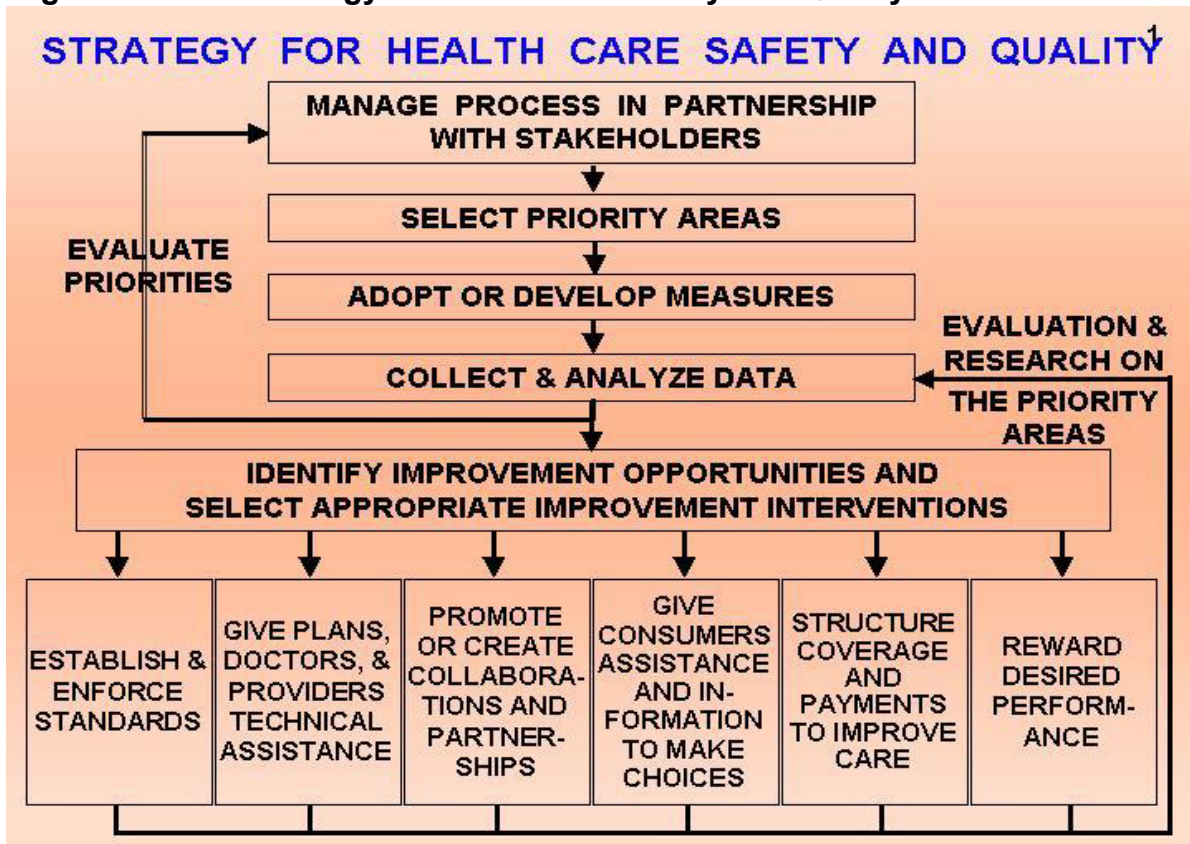
CMS was also very interested in pilot testing the concept of data collection by providers themselves, rather than data collection contracted out to production oriented experts as had been the model used by CMS until this time. Currently, CMS contracts with two entities called Clinical Data Abstraction Centers (CDAC) to collect data from medical records across the country. With the JCAHO ORYX® pilot test based on provider data collection, CMS determined that this would be a ready made opportunity to test the concept of provider data collection and submission to a national entity. CMS also decided that the experience gained in Rhode Island in terms of what to report and how to report it would inform their decision-making process on a national reporting level. Thus, the Rhode Island legislation offered an opportunity for both Rhode Island and CMS to achieve their purposes better by working together.

There is increasing national attention to performance measurement and reporting on health care quality. Three of the major organizations involved include CMS, JCAHO and the National Quality Forum (NQF).

CMS uses a multifaceted strategy to improve health care quality (Figure 1). Performance measurement currently plays a role in technical assistance to doctors and other providers

and in giving consumers information on which to make choices. At some point in the future, performance measurement could be used to reward desired performance.

**Figure 1: CMS “Strategy for Health Care Safety and Quality”**



CMS contracts with Quality Improvement Organizations (QIO) in each state to provide technical assistance in quality improvement to physicians and other providers. The QIO in Rhode Island is RIQP. These QIOs typically provide confidential performance information to collaborating providers. These performance measurements are used to gauge the impact of systems changes designed to improve care.

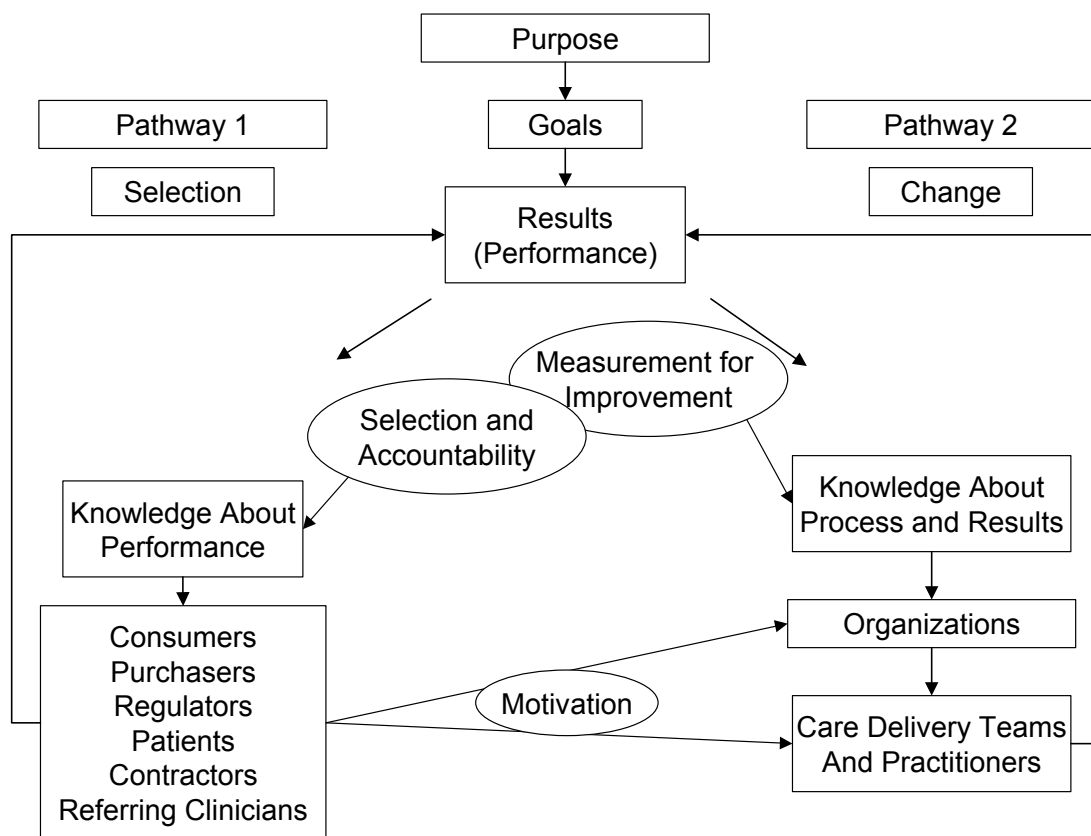
More recently, CMS has provided quality information on nursing homes that consumers can use to make choices. This public report was tested first in RI and five other states and was rolled out nationally in November of 2002. CMS has announced the intention to publicly report on the quality of home health agencies and hospitals over the next few years.

Rewarding desired performance could take the form of extra payment for better quality. CMS is currently testing this approach in managed care organizations for care in heart failure. There are likely to be demonstration projects testing this approach in other settings before widespread adoption in other settings.

The JCAHO mandates the use of performance measurement by accredited healthcare organizations for the purpose of improving the organizations' performance through continuous system redesign and evaluation. Most recently, the JCAHO has recently adopted a set of core clinical quality measures for hospitals, thus standardizing the data collection procedures needed for performance measure composition. These performance measures are confidential to the healthcare organizations and JCAHO provides hospitals with national comparison data.

The NQF is a non-profit, volunteer, consensus, standard-setting organization for health care. It was formed under recommendations from the President's Commission on Health Care Quality. Performance measures endorsed by the NQF will likely be used nationally in the measurement and reporting of health care quality. The NQF is currently preparing a set of measures on hospital quality that is expected to become public over the next few months.

**Figure 2: National Quality Forum Strategic Framework Board ("Two Pathways to Quality Improvement")<sup>1</sup>**



The Strategic Framework Board of the NQF has developed a model describing the two major uses for performance measurement (Figure 2). The selection pathway provides information that consumers and their proxies can use in judging the quality of providers. The improvement pathway uses performance measurement in self-assessment to evaluate the impact of systems changes designed to improve health care processes. It is argued

that the selection pathway enhances the motivation for improvement and that continuous system redesign produces sustained improvements in quality.

Measures for self-assessment and measures for selection have different considerations and desirable characteristics. The measures developed for this report have been judged by the decision-makers to be suitable for selection purposes.

### ***JCAHO Performance Measurement***

JCAHO was established in 1951 as an independent not for profit evaluation and accrediting body for healthcare organizations. JCAHO's mission is to continuously improve the safety and quality of care provided to the public through accreditation and related services that support performance in healthcare organizations. It now accredits more than 17,000 organizations in the United States.

In 2000, JCAHO rolled out a pilot project to test the Hospital Core Performance Measures, a standardized set of hospital performance measures. Three sets of condition-based measures were included in this pilot project: acute myocardial infarction, heart failure, and community-acquired pneumonia. To a great degree, the measures for the three conditions were derived from the previous work of CMS and the QIO Program. The JCAHO Hospital Core Performance Pilot Project Measure specifications are the basis of the data collected to produce this report.

JCAHO piloted the measure sets for the first three conditions with the assistance of the hospital associations from five states (Connecticut, Georgia, Michigan, Missouri, and Rhode Island) during 2001. The data collected for the JCAHO pilot for discharges from May 2001 to December of 2001 were used in the preparation of this report. A total of 83 hospitals from 9 states participated in the project. In total the participants included 49 hospitals for Acute Myocardial Infarction, 72 hospitals for heart failure, and 57 hospitals for pneumonia.

Since the pilot was initiated, the JCAHO measure sets for acute myocardial infarction, heart failure, and community-acquired pneumonia and the CMS measure sets for the same conditions have become virtually identical. This is the result of intensive efforts by both parties. This agreement is of great benefit to the hospitals in minimizing the potential for duplication of their tasks involved in data collection activities to serve two different parties.

## **Methodology**

### ***Data Collection***

#### ***Development of a Standardized Data Collection Tool***

A standardized, computerized, data collection tool was created by Qualidigm using MedQuest® software. This software was developed by CMS and is in the public domain. It is used extensively for quality improvement and project data collection related to the peer review organization (PRO) program. A Qualidigm employed nurse, experienced in



tool development for the abstraction of medical records data, designed the tool to collect all the data elements required per the specifications contained in the Hospital Core Measure Pilot Project Technical Specification Manual prepared by the JCAHO. The data collection tool was organized to allow the abstractors to collect data from the medical record in a sequence that parallels that of the medical record. Skip logic was used to eliminate unnecessary data collection and minimize burden. Online help was available through help screens within the tool to minimize the need to use reference documents.

Centralized training was provided to all individuals at hospitals in Rhode Island who used the data collection tool. This was possible due to the small number of hospitals and their close physical proximity.

### **Measures**

Tables 1-3 list the performance measures collected for each of the three conditions and identifies which measures were ultimately included in the reports. The reasons that some measures were excluded are discussed later in this report.

**Table 1: Acute Myocardial Infarction Performance Measures**

<b>Acute Myocardial Infarction Quality Indicators</b>	<b>Included in Report</b>
Aspirin within 24 hrs of arrival or within 24 hrs prior to arrival	Yes
Beta-blocker within 24 hours of arrival	Yes
Timely reperfusion: Interval from time of arrival to initiation of thrombolysis	Yes
PTCA: Time from arrival to initiation of primary percutaneous transluminal coronary angioplasty	No
Aspirin at discharge	Yes
Beta-blocker at discharge	Yes
ACEI inhibitor at discharge for LVEF < 40%	Yes
Patients with a history of cigarette use within the past year who receive smoking cessation advice or counseling during the hospitalization	No
Inpatient mortality	No

**Table 2: Heart Failure Performance Measures**

<b>Heart Failure Quality Indicators</b>	<b>Included in Report</b>
Heart failure patients with complete discharge instructions in medical record	No
Heart Failure patients not admitted on ACEI or ARB with LVEF evaluation documented in medical record	Yes
Patients with a history of smoking in the past year who receive smoking cessation advice or counseling during hospitalization	No
Patients with LVEF less than 40 % prescribed ACEI at discharge	Yes
Appropriate use/non-use of ACEI at Discharge	No
HF patients with atrial fibrillation receiving oral anticoagulation therapy (Warfarin/Coumadin) unless a relative or absolute contraindication to Warfarin/Coumadin exists	No

**Table 3: Community Acquired Pneumonia Performance Measures**

<b>Community Acquired Pneumonia Quality Indicators</b>	<b>Included in Report</b>
Time from initial hospital arrival to first dose of antibiotic	Yes
Number of pneumonia inpatients screened for and/or given pneumococcal vaccination	Yes
Number of pneumonia patients whose blood cultures are collected before the first dose of antibiotic	Yes
Adult inpatients, age 18 and older, with a history of smoking within the past year who receive smoking cessation advice or counseling during hospitalization	No
Pediatric patients, and/or their caregivers, with a history of smoking within the past year who receive smoking cessation advice or counseling during hospitalization	No
Patients who receive oxygenation assessment with arterial blood gas or pulse oximetry within 24 hours of hospital arrival	Yes

***Hospitals Included in the Report***

Only licensed hospitals that regularly care for patients with heart attack, heart failure, and pneumonia were included in the report. A list of hospitals in Rhode Island that participated in this project can be found in Table 4.

**Table 4: Hospitals in Rhode Island Included in the Report**

<i>Hospital Name</i>	<i>City/State</i>
Kent County Memorial Hospital	Warwick, RI
Landmark Medical Center	Woonsocket, RI
Memorial Hospital of Rhode Island	Pawtucket, RI
The Miriam Hospital	Providence, RI
Newport Hospital	Newport, RI
Our Lady of Fatima Hospital	North Providence, RI
Rhode Island Hospital	Providence, RI
Roger Williams Medical Center	Providence, RI
South County Hospital	Wakefield, RI
Westerly Hospital	Westerly, RI

***Sampling***

The hospital billing system generated a file for a given month's discharges two weeks following the close of that month. Data sampling was conducted in an automated process using software written by Qualidigm. This software program was developed to identify which cases met the criteria for inclusion in the Core Measures. If there were 50 or fewer cases for a condition during the month for a hospital, then the entire population was abstracted. If there were more than 50 cases for a given condition within a month then the data was sampled randomly according to the specifications in Table 5.

**Table 5: Sampling Methodology for Rhode Island Pilot Project**

<i>Monthly Population Size</i>	<i>Minimum required sample size</i>
<50	No sampling, 100% Population
50 - 249	50
250 - 999	20% of population
>= 1000	200

***Medical Records Abstraction***

Hospitals were responsible for their own medical records abstraction. Data were collected at most of the hospitals by a combination of downloading data from existing hospital information systems and medical records abstraction performed by individuals who were trained by the Qualidigm staff. The majority of abstractors were nurses employed by their respective hospitals. A few of the hospitals contracted to have abstraction services provided by Qualidigm because they did not have staff available to be assigned to the project.

***Data Transmission***

Data on the three conditions were transmitted to Qualidigm on a monthly basis. The data for patients discharged in a given month were typically abstracted two months after the close of that month. Patient level data were then transferred to Qualidigm via a virtual private network (VPN), file transfer protocol (FTP), or mailed diskette. Qualidigm calculated hospital level performance data for each measure. Approximately three weeks after Qualidigm received the patient level data from the hospitals, hospital level performance data were transferred to the JCAHO to satisfy the JCAHO accreditation requirements for the hospitals. Qualidigm was able to perform this service as an approved vendor for the JCAHO ORYX system. Hospital level performance data were also transferred from Qualidigm to HARI and RIQP on a periodic basis. This was made possible via a multi-party data release and confidentiality agreement.

***Data Quality Audit***

The quality of data collected by the hospitals was ensured by an independent data audit conducted by sub-contractors to Qualidigm. A sample of five cases per condition were re-abstracted at each hospital on two separate occasion during the project. Agreement rates and Kappa scores were calculated for each data element in the data collection tool. The independent reviewers adjudicated their findings with the original abstractors. Any problems with data quality or interpretation of abstraction instructions at the hospital were addressed during the audits. The results of the data quality audits were presented to the Core Clinical Measures Workgroup to facilitate decisions regarding the suitability of individual measures for inclusion in public reports.

## Public Report Design

### ***Challenges to Public Report Design – Precision and Reader Comprehension***

In June of 2001 the hospitals in Rhode Island began transmitting pilot project data to Qualidigm. It quickly became apparent that the number of cases that were eligible for many of the hospital quality performance measures would be quite small. Despite the fact that the hospitals in Rhode Island are on average larger than typical U.S. hospitals, it was not uncommon to have only one or two cases eligible for a measure in a particular month. The small number of cases eligible for inclusion in the denominator of many of the measures creates a substantial problem with statistical precision when considering the development of public reports. Measures of performance based on small samples may not be representative of the true underlying performance rate. Consider the example of a hospital with only 8 cases in the denominator of a particular performance measure and a measured rate of 75% (6 cases out of 8 met the criteria for inclusion in the numerator). The 95% confidence interval for the underlying performance rate ranges from a lower limit of 37% to an upper limit of 97%<sup>2</sup>. Although the requirements for degree of confidence and precision of the estimate will vary with the intended use of the performance measurement data, such a wide confidence interval is not acceptable for the purposes of public reporting.

From a consumer's perspective, numerous and potentially conflicting measurement scores can be overwhelming and potentially confusing. This project evaluated a total of 21 performance measures. Drawing conclusions from such large volumes of data are especially problematic because the scores of the individual measures can be contradictory and therefore make it difficult for one to form an opinion about overall quality. Landrum et al. identified several instances where the results of profiles based on individual measures were contradictory (e.g. three hospitals were in the quartile for hospitals with the highest quality with respect to 30 day mortality while having poor performance in processes of care).<sup>3</sup> It is doubtful that the typical consumer is equipped to create a mental framework to weigh the importance of multiple individual measures and create an overall assessment of quality when the research of Hibbard and Jewett<sup>4</sup> has shown that individual quality indicators are not well understood and are interpreted in unintended ways. For example for some measures readers were unable to determine whether or not a high score or low score is better when evaluating an individual measure.

The terminology used in the names of individual performance measures is also confusing. McGlynn<sup>5</sup> suggests that the name of a measure such as "proportion of patients receiving thrombolytic therapy within 6 hours of onset of symptoms of myocardial infarction" is meaningful to clinicians but not to a consumer audience. It is unlikely that consumers can draw conclusions from the reported performance results of multiple measures and conditions when, in many situations, it is unlikely that they understand the significance of the clinical process that a measure evaluates. McGlynn proposes that the description of the measure might be changed to "quality of heart attack treatment in the hospital". But with multiple measures related to heart attack care it would be confusing to report six or

seven potentially conflicting measures all described as “the quality of heart attack treatment”.

### **Composite Measures**

A composite measure combines many aspects of care into a single score or rating. By reporting on multiple aspects of care in a single measure, the problem of small sample size is diminished because the sample becomes the aggregate of all the samples for measures included in our composite. The use of composite or summary measures also reduces the amount of information that consumers must process when making a decision. The methodology used to create composite measures of hospital performance for each condition are described below.

Measures to be included in the composite score were selected by the core clinical measures workgroup. Details of this process are included in the next sub-section. Care was taken to make sure that not more than one measure was included that examines the same aspect of care to prevent excessive weighting of that aspect of care in the scoring. Examples of duplicate measures would be “Appropriate Use/ Non-use of ACEI” and “ACEI for patients with LVEF less than 40%”.

Any continuous variable measures (e.g., Time to antibiotics for pneumonia patients) were converted to rate based measures by establishing a threshold (e.g., eight hours) and then calculating the number of patients that received care within the limits of the threshold (e.g., Pneumonia patients receiving antibiotics within 8 hours).

The numerators of all included individual performance measures for the condition were summed to determine the composite numerator. The denominators of all included individual performance measures for the condition were summed to determine the composite denominator. The composite numerator was divided by the composite denominator to determine the composite performance rate.

Table 6 provides an example of the calculation of a condition level composite (heart attack care) with six individual measures as components.

**Table 6: Heart Attack Care Composite Measure Example**

Measure	Denominator	Numerator
Aspirin at Admission	17	15
Aspirin at Discharge	12	10
Beta Blocker at Discharge	8	9
Beta Blocker at Arrival	8	8
ACEI for LVSD	3	3
Time to Thrombolytics	2	1
Heart Attack Care Composite	50	46

**Calculated Heart Attack Care Composite Rate =  $46/50 = 92\%$**

### ***Selection of measures for public reporting***

The Hospital Core Clinical Measures Public Reporting Work Group was formed by the Rhode Island Department of Health to evaluate which measures should be included in public reports. The workgroup included representatives from each of the hospitals in Rhode Island, the Hospital Association of Rhode Island, Rhode Island Quality Partners, Qualidigm, and the Rhode Island Department of Health. The workgroup met approximately once per month over a 10 month period to select which measures should be included in the report and to design the format of the public report. The workgroup reviewed information on the validity and reliability of data and clinical evidence supporting the measures to decide which measures would be included in the public report. The reasons that some measures that were not included in the public report are discussed below:

#### **Acute Myocardial Infarction Measures:**

##### Time to PTCA

Patients who are transferred in from another hospital are excluded from this measure. The result is a large number of patients that receive PTCA are not included in the measure. This issue was not addressed in the refinements.

This measure is intended to measure the time to PTCA only for those patients that receive PTCA as a primary therapy. The measure specifications for this measure did not preclude the possibility of patients that received PTCA as a secondary therapy from being included in this measure. This problem was addressed in refinements to the measure specifications.

##### Smoking Cessation Counseling

The data from the RI Pilot Project showed substantial variation in the proportion of patients identified as smokers (from 2% to 36%). This suggests that the documented smoking status of patients may be unreliable. One method of increasing the reliability would be to develop a measure for whether or not the hospital performed an assessment of smoking status for AMI patients.

The assessment of whether or not a patient received smoking cessation counseling was the least reliable of all abstracted variables (agreement rate = .56, K = .16). Refinements were made to the instructions of the smoking counseling measure in an effort to improve future reliability for the data elements related to this measure.

##### AMI Inpatient Mortality:

This measure was not included in the public report because numerous studies have shown that the use of risk adjusted mortality data is not a very sensitive or specific measure of hospital quality.<sup>6</sup>

## **Heart Failure Measures:**

### Patients with atrial fibrillation receiving oral anticoagulation therapy

Only 20% of Heart Failure patients were eligible for this measure. It was recommended that this measure be dropped from the Heart Failure measure set and that a measure be developed that looks at all patients with atrial fibrillation rather than limit it to the heart failure subset.

### Heart failure patients with complete discharge instructions in the medical record

This measure was somewhat controversial with participating hospitals because there was a widespread feeling that evidence supporting this measure is weaker than for many of the other measures. While the importance of having patients comply with discharge instructions is supported in current guidelines there are no data from clinical trials that show an association between the completeness of written discharge instructions and outcomes for heart failure patients.

This measure requires that the hospital provide written discharge instructions that address six distinct areas (activity level, diet, discharge instructions, follow-up appointment, weight monitoring, and what to do if symptoms worsen). An additional concern among participating hospitals was that the current scoring methodology does not differentiate between a case where the hospital fails in providing only one aspect of discharge instructions and a case where the hospital failed at providing five out of six.

### Appropriate use/non-use of ACEI at discharge

This measure was one of two test measures related to the use of ACEI. The measure construction style utilized by this measure results in a much lower proportion of cases being eligible for inclusion. Therefore, changes measured in performance may result from either changes in the proportion of patients with indications that receive ACEI, or changes in the proportion of patients with absolute contraindications that do not receive ACEI. With this construction style it is possible for a hospital to improve their measured performance level by more thoroughly documenting contraindications without actually improving the frequency with which ACEI is prescribed to patients for whom it is indicated.

It was recommended to the JCAHO that this measure be dropped in favor of HF-44 which uses the “ideal” construction style when examining the use of ACEI.

### Smoking Cessation Advice Counseling:

The assessment of whether or not a patient received smoking cessation counseling was the least reliable of all abstracted variables (agreement rate = .56, K = .16). Refinements were made to the instructions of the smoking counseling measure in an effort to improve future reliability for the data elements related to this measure.

## **Pneumonia Measures:**

### Adult CAP smoking cessation counseling

The assessment of whether or not a patient received smoking cessation counseling was the least reliable of all abstracted variables (agreement rate = .56, K = .16). Refinements were made to the instructions of the smoking counseling measure in an effort to improve future reliability for the data elements related to this measure.

### Pediatric smoking cessation counseling

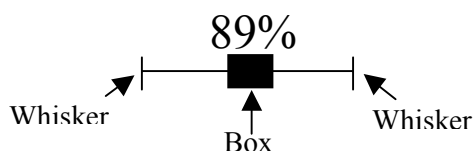
The face validity for this measure is doubtful, as pediatric smokers may be unlikely to self identify. This measure also has extremely small sample sizes. Many hospitals had no eligible cases for this measure.



## How to read the graphs in the report

On the following page is a “sample graph” to help you understand how to read the graphs in this report.

Measurement of hospital performance is never exact. This report, therefore, uses “Box and Whisker” symbols to show you both our best estimate of the performance rate and the range of rates in which we are very confident the “true” rate falls. Here’s the “Box and Whisker” symbol:



### ***Reading a graph with a Box and Whisker symbol***

*To find the best estimate of how often a particular hospital provides recommended care:*

- Find the hospital name on the graph.
- Follow the line from the hospital name to the Box and Whisker symbol on the graph.
- The “Box” in the center of the symbol shows the best estimate of the hospital’s performance rate. The performance rate (here it’s 89%) is shown above the “Box”.

*To find the performance rate for All Participating Hospitals:*

- Find the shaded vertical line on the sample graph. In this sample graph, the performance rate for All Participating Hospitals is 80%.

*To compare the performance rate of a particular hospital to the rate for All Participating Hospitals:*

- Find the hospital name on the graph.
- Follow the line from the hospital name to the Box and Whisker symbol on the graph.
- If the “Whiskers” on the symbol overlap the vertical line marking the performance rate for All Participating Hospitals” then the performance rate for that hospital is about the same as the overall rate for All Participating Hospitals.
- If the “Whiskers” on the symbol are entirely to the right of the vertical line marking the performance rate for All Participating Hospitals then the performance rate for that hospital is higher (better) than the overall rate for All Participating Hospitals.
- If both the “Whiskers” on the symbol are entirely to the left of the vertical line, then the performance rate for that hospital is lower (worse) than the overall rate for All Participating Hospitals.

### **Why are some confidence intervals not equally distributed around the mean?**

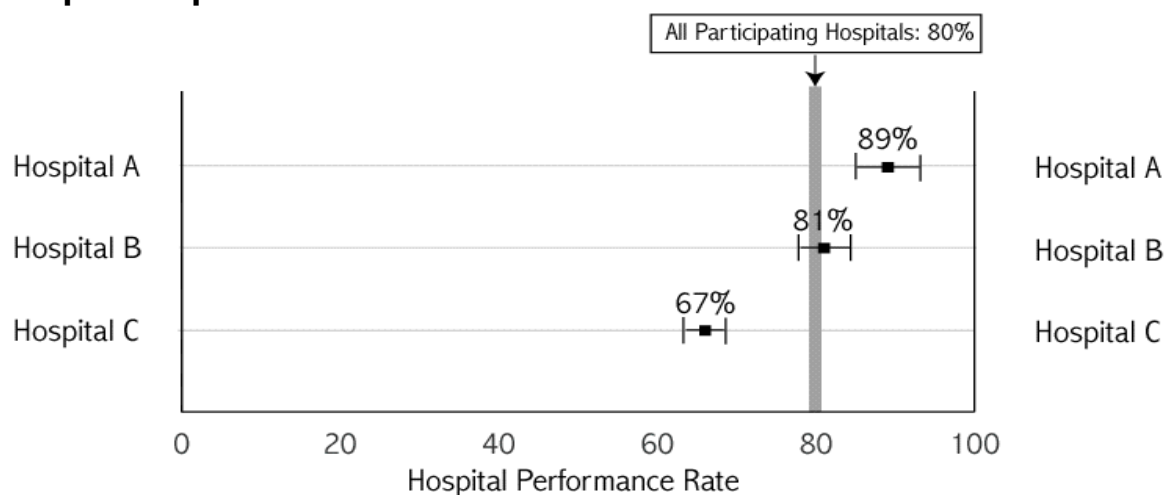
The most common method for estimating a confidence interval around a point estimate of a proportion ( $p$ ) is the normal theory method. Calculations based on the normal approximation to the binomial are far less cumbersome than those based on the exact binomial distribution. The normal theory method is based on the assumption that the normal distribution approximates the binomial distribution. The assumption that the normal distribution approximates the binomial is only valid for situations where the sample size ( $n$ ) is relatively large and  $p$  is not close to either 0 or 1.

The normal theory is considered valid when the following equation is true:

$$(p)(1-p)(n) \geq 5$$

Application of the normal theory method will result in a confidence interval that is equally distributed around the point estimate (e.g. 88% +2 –2). In the Rhode Island Public Report on Hospital Core Clinical Measures normal theory method was used in calculation of confidence intervals whenever it was valid. There were a few situations where the measured performance rate was very close to 1 (100%) and therefore the exact method of confidence interval calculation was utilized. Use of the exact method for calculating the confidence interval in these situations results in a confidence interval that is not equally distributed around the point estimate for hospital performance (e.g. 97% +2 – 6).

## Sample Graph



- First, follow the line to find the Box and Whiskers symbol for **Hospital A:**
  - 89% is our best estimate for the performance rate of Hospital A.
    - The entire “Box and Whiskers” symbol is to the right of the score for All Participating Hospitals.
    - So, Hospital A has a hospital performance rate **higher** than the average for All Participating Hospitals – a better score.
- Now, follow the line to find the symbol for **Hospital B:**
  - 81% is our best estimate for the performance rate of Hospital B.
  - The Box and Whiskers symbol overlaps the vertical line that shows the score for All Participating Hospitals.
  - So, Hospital B has a hospital performance rate **about the same** as the average for All Participating Hospitals.
- Last, follow the line to find the Box and Whiskers symbol for **Hospital C:**
  - 67% is our best estimate of the performance rate of Hospital C.
  - The entire “Box and Whisker” symbol is to the left of the score for All Participating Hospitals.
  - So, Hospital C has a hospital performance rate **below** the average for all participating hospitals – a worse score.

## Acute Myocardial Infarction Performance Rates

The performance rates and the corresponding upper and lower limits of the 95% confidence interval are listed for each hospital for each individual AMI performance measure in Table 6. Performance rates are only listed when the hospital had a denominator of 25 cases or more for that measure. The acute myocardial infarction composite scores for each hospital are listed in Table 6 and displayed graphically in Figure 3.

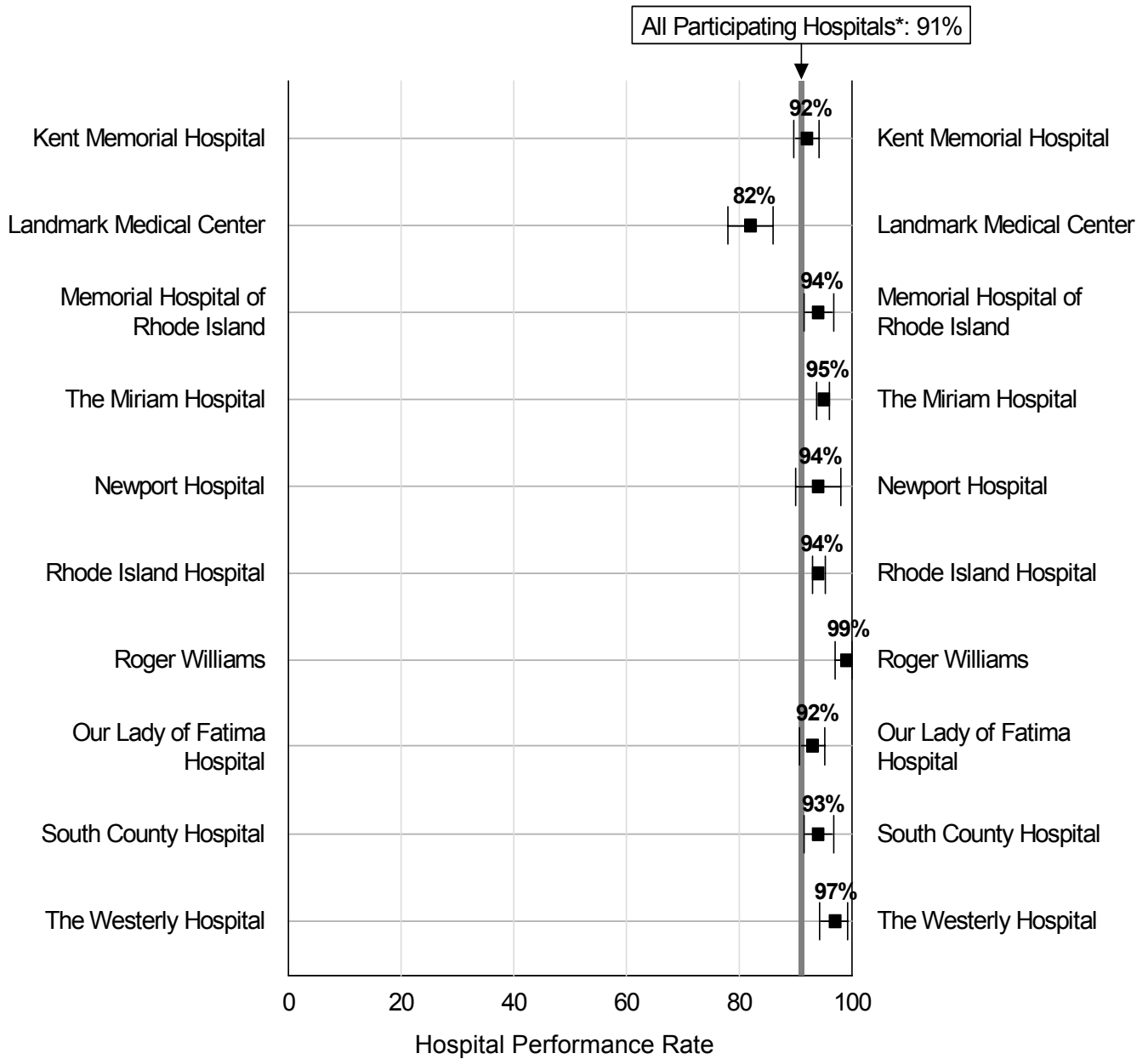
### Rhode Island AMI Hospital Composite Scores for May/2001 to Dec/2001

Indicator		Kent Memorial Hospital	Landmark Medical Center	Memorial Hospital of RI	Newport Hospital	Rhode Island Hospital	Roger Williams	Saint Joseph of R.I.	South County Hospital	The Miriam Hospital	The Westerly Hospital	RI State	National (5 States)
ASA at arrival	Den	281	114	106	56	389	101	152	132	386	67	1784	8091
	Num	266	98	103	54	372	101	145	130	361	67	1697	7657
	Rate	0.95	0.86	0.97	0.96	0.96	1.00	0.95	0.98	0.94	1.00	0.95	0.95
	SD	0.013	0.033	0.016	0.025	0.010	0.000	0.017	0.011	0.013	0.000	0.005	0.003
	Lower95CI*	0.920	0.796	0.890	0.875	0.936	0.970	0.921	0.985	0.911	0.945	0.941	0.941
	Upper95CI*	0.973	0.923	0.980	0.990	0.977	1.000	0.987	0.995	0.960	1.000	0.961	0.951
ASA at Discharge	Den	143	45	51	25	348	59	75	56	365	24	1191	6004
	Num	139	42	50	24	341	59	66	51	362	**	1158	5756
	Rate	0.97	0.93	0.98	0.96	0.98	1.00	0.88	0.91	0.99	**	0.97	0.96
	SD	0.014	0.037	0.019	0.039	0.008	0.000	0.038	0.038	0.005	**	0.005	0.003
	Lower95CI*	0.945	0.845	0.900	0.805	0.965	0.940	0.806	0.810	0.975	**	0.963	0.954
	Upper95CI*	0.990	0.955	0.999	0.990	0.995	1.000	0.954	0.975	0.999	**	0.982	0.964
ACEI for LVEF<40%	Den	32	18	5	8	67	10	21	19	70	8	258	1326
	Num	29	**	**	**	64	**	**	**	65	**	232	1120
	Rate	0.91	**	**	**	0.96	**	**	**	0.93	**	0.90	0.84
	SD	0.052	**	**	**	0.025	**	**	**	0.031	**	0.019	0.010
	Lower95CI*	0.765	**	**	**	0.880	**	**	**	0.845	**	0.862	0.825
	Upper95CI*	0.950	**	**	**	0.990	**	**	**	0.975	**	0.936	0.864
Beta Blocker at Arrival	Den	230	109	85	39	327	102	139	106	327	60	1524	6645
	Num	224	81	82	38	307	102	131	100	299	59	1423	5669
	Rate	0.97	0.74	0.96	0.97	0.94	1.00	0.94	0.94	0.91	0.98	0.93	0.85
	SD	0.011	0.042	0.020	0.025	0.013	0.000	0.020	0.022	0.015	0.017	0.006	0.004
	Lower95CI*	0.953	0.661	0.890	0.875	0.913	0.970	0.904	0.899	0.884	0.920	0.921	0.845
	Upper95CI*	0.995	0.825	0.990	0.990	0.965	1.000	0.981	0.987	0.945	0.999	0.946	0.862
Beta Blocker at Discharge	Den	156	57	50	23	335	59	79	49	329	27	1164	5699
	Num	153	50	47	**	319	59	76	45	316	26	1113	5195
	Rate	0.98	0.88	0.94	**	0.95	1.00	0.96	0.92	0.96	0.96	0.96	0.91
	SD	0.011	0.043	0.034	**	0.012	0.000	0.022	0.039	0.011	0.036	0.006	0.004
	Lower95CI*	0.945	0.792	0.840	**	0.929	0.940	0.875	0.825	0.939	0.810	0.944	0.904
	Upper95CI*	0.999	0.962	0.975	**	0.975	1.000	0.990	0.995	0.982	0.990	0.968	0.919
Time to Thrombolytics < 30 min	Den	45	6	10	8	30	3	15	12	10	6	145	145
	Num	7	**	**	**	4	**	**	**	**	**	41	41
	Rate	0.16	**	**	**	0.13	**	**	**	**	**	0.28	0.28
	SD	0.054	**	**	**	0.062	**	**	**	**	**	0.037	0.037
	Lower95CI*	0.050	**	**	**	0.055	**	**	**	**	**	0.209	0.209
	Upper95CI*	0.261	**	**	**	0.300	**	**	**	**	**	0.356	0.356
AMI Composite Score	Den	887	349	307	159	1496	334	481	374	1487	192	6066	27910
	Num	818	286	289	149	1407	331	442	349	1406	187	5664	25438
	Rate	0.92	0.82	0.94	0.94	0.94	0.99	0.92	0.93	0.95	0.97	0.93	0.91
	SD	0.009	0.021	0.013	0.019	0.006	0.005	0.012	0.013	0.006	0.011	0.003	0.002
	Lower95CI*	0.905	0.779	0.915	0.899	0.929	0.970	0.895	0.908	0.934	0.935	0.927	0.908
	Upper95CI*	0.940	0.860	0.968	0.975	0.952	0.995	0.943	0.958	0.957	0.985	0.940	0.915

\* Note: 95% Confidence Intervals were calculated using the normal approximation to the binomial in situations where that assumption is valid (pqn >5), otherwise exact confidence intervals were calculated

\*\* Performance rates are not displayed where denominators are less than 25.

**Figure 3: Heart Attack Care**  
**How often do hospitals give recommended care?**



This graph shows the hospital performance rate for 10 different hospitals in Rhode Island for the period May 2001 through December 2001. The hospital performance rate is the percentage of times that the hospital gave the recommended care for patients with a heart attack. A higher number is better.

\* Forty-nine hospitals in conjunction with five state hospital associations participated in the quality measurement project for heart attack care conducted by the Joint Commission on Accreditation of Healthcare Organizations.

## Heart Failure Performance Rates

The performance rates and the corresponding upper and lower limits of the 95% confidence interval are listed for each hospital for each individual heart failure performance measure in Table 7. Performance rates are only listed when the hospital had a denominator of 25 cases or more for that measure. Heart failure composite scores for each hospital are listed in Table 7 and displayed graphically in Figure 4.

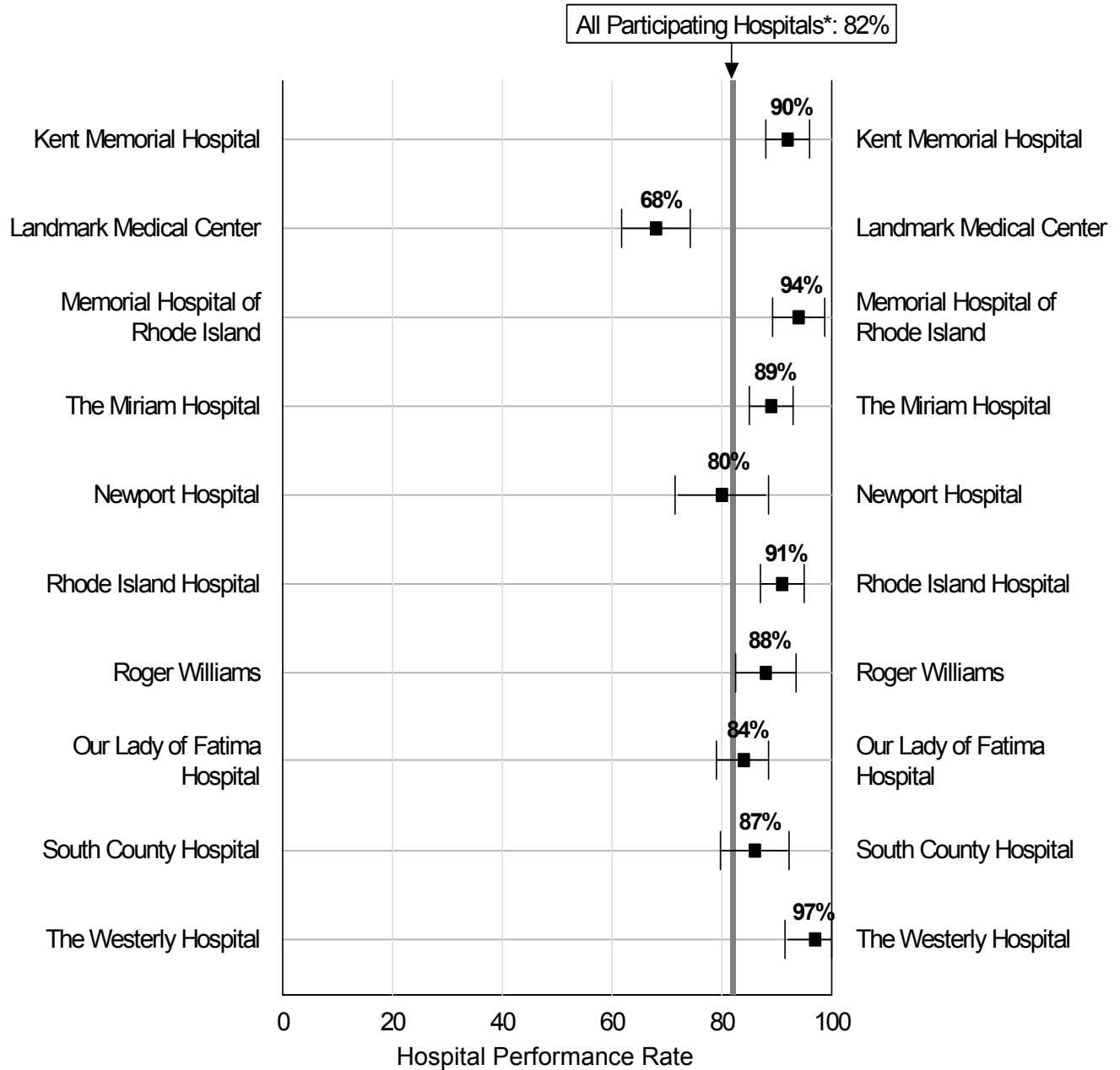
**Table 7: Heart Failure Performance Rates for Hospitals in Rhode Island: May/2001 to Dec/2001**

Indicator		Kent Memorial Hospital	Landmark Medical Center	Memorial Hospital of RI	Newport Hospital	Rhode Island Hospital	Roger Williams	Saint Joseph of R.I.	South County Hospital	The Miriam Hospital	The Westerly Hospital	RI State	All Participating Hospitals
ACEI for LVEF < 40	Den	75	50	43	27	111	29	65	32	100	23	555	3103
	Num	67	36	39	25	101	28	54	30	90	**	492	2682
	Rate	0.89	0.72	0.91	0.93	0.91	0.97	0.83	0.94	0.90	**	0.89	0.86
	SD	0.036	0.063	0.044	0.050	0.027	0.034	0.047	0.043	0.030	**	0.013	0.006
	Lower95CI*	0.823	0.596	0.775	0.760	0.857	0.825	0.740	0.800	0.841	**	0.860	0.852
	Upper95CI*	0.963	0.844	0.975	0.990	0.963	0.990	0.922	0.985	0.959	**	0.913	0.876
Not on ACEI, LVEF evaluated	Den	137	125	67	33	125	72	142	69	121	54	945	5454
	Num	123	83	64	23	114	61	120	57	107	53	805	4316
	Rate	0.90	0.66	0.96	0.70	0.91	0.85	0.85	0.83	0.88	0.98	0.85	0.79
	SD	0.026	0.042	0.025	0.080	0.025	0.042	0.030	0.046	0.029	0.018	0.012	0.006
	Lower95CI*	0.847	0.581	0.885	0.540	0.862	0.764	0.786	0.737	0.827	0.910	0.829	0.781
	Upper95CI*	0.949	0.747	0.990	0.854	0.962	0.930	0.905	0.916	0.941	0.999	0.875	0.802
HF Composite Score	Den	212	175	110	60	236	101	207	101	221	77	1500	8557
	Num	190	119	103	48	215	89	174	87	197	75	1297	6998
	Rate	0.90	0.68	0.94	0.80	0.91	0.88	0.84	0.86	0.89	0.97	0.86	0.82
	SD	0.021	0.035	0.023	0.052	0.019	0.032	0.025	0.034	0.021	0.018	0.009	0.004
	Lower95CI*	0.855	0.611	0.891	0.699	0.875	0.818	0.791	0.794	0.850	0.910	0.847	0.810
	Upper95CI*	0.937	0.749	0.982	0.901	0.947	0.944	0.890	0.929	0.932	0.985	0.882	0.826

\* Note: 95% Confidence Intervals were calculated using the normal approximation to the binomial in situations where that assumption is valid (pqn > 5) otherwise exact confidence intervals were calculated.

\*\* Performance rates are not displayed where denominators are less than 25.

**Figure 4: Heart Failure Care**  
**How often do hospitals give recommended care?**



This graph shows the hospital performance rate for 10 different hospitals in Rhode Island for the period May 2001 through December 2001. The hospital performance rate is the percentage of times that the hospital gave the recommended care for patients with a heart attack. A higher number is better.

\* Seventy-two hospitals in conjunction with five state hospital associations participated in the quality measurement project for heart attack care conducted by the Joint Commission on Accreditation of Healthcare Organizations.

## Pneumonia Performance Rates

The performance rates and the corresponding upper and lower limits of the 95% confidence interval are listed for each hospital for each individual pneumonia performance measure in Table 8. Performance rates are only listed when the hospital had a denominator of 25 cases or more for that measure. Pneumonia composite scores for each hospital are listed in Table 8 and displayed graphically in Figure 5.

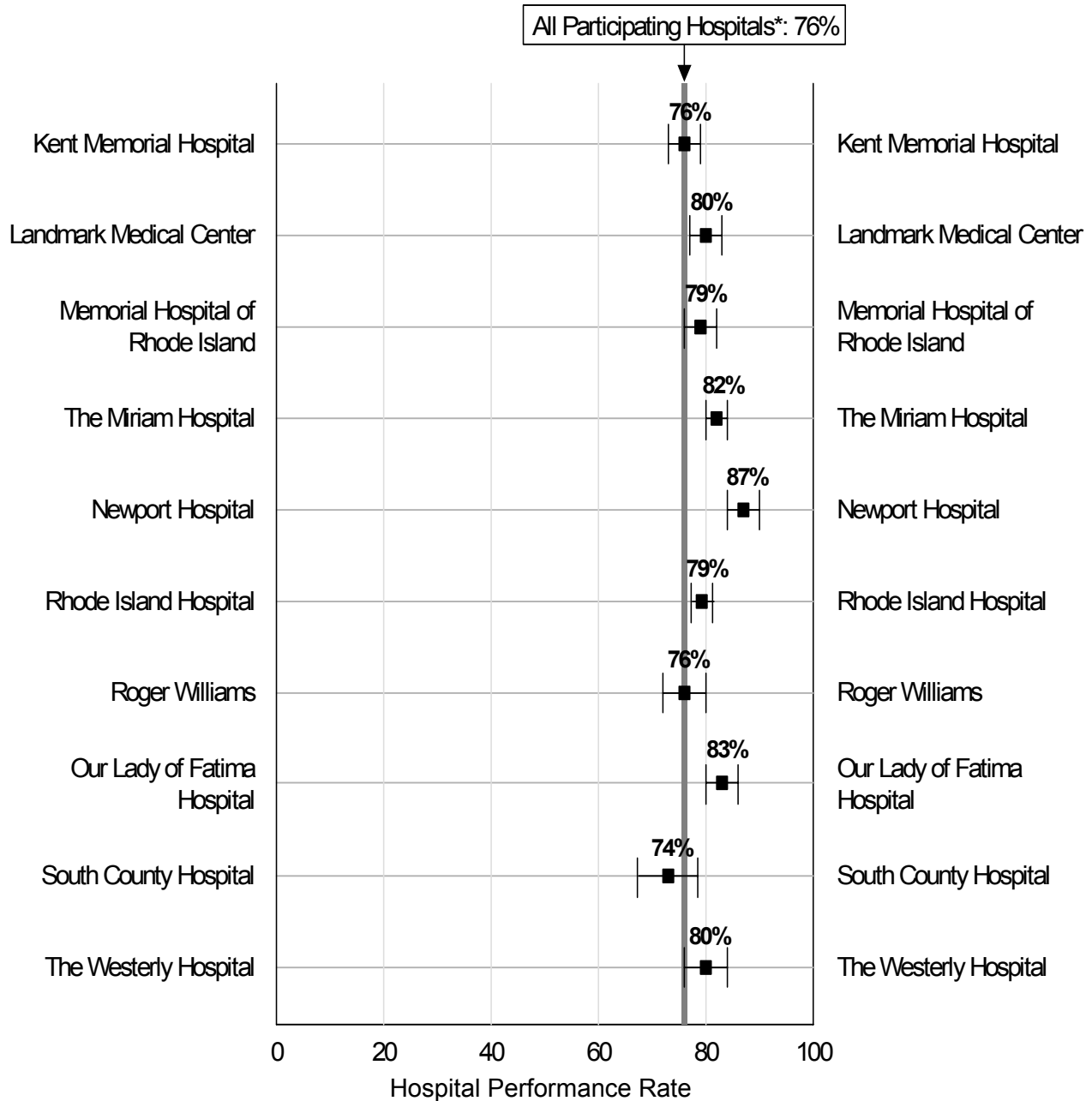
**Table 8: Pneumonia Performance Rates for Hospitals in Rhode Island: May/2001 to Dec/2001**

Indicator		Kent Memorial Hospital	Landmark Medical Center	Memorial Hospital of RI	Newport Hospital	Rhode Island Hospital	Roger Williams	Saint Joseph of R.I.	South County Hospital	The Miriam Hospital	The Westerly Hospital	RI State	All Participating Hospitals
Oxygen Assessment within 24 hrs of Arrival	Den	293	211	163	121	339	114	235	26	271	103	1876	8359
	Num	292	211	163	121	338	114	229	24	266	103	1861	7966
	Rate	0.997	1.00	1.00	1.00	0.997	1.00	0.97	0.92	0.98	1.00	0.99	0.95
	SD	0.003	0.000	0.000	0.000	0.003	0.000	0.010	0.052	0.008	0.000	0.002	0.002
	Lower95CI*	0.990	1.000	1.000	1.000	0.985	1.000	0.954	0.775	0.955	1.000	0.988	0.948
	Upper95CI*	0.999	1.000	1.000	1.000	0.999	1.000	0.995	0.965	0.992	1.000	0.996	0.958
Pneumococcal Vaccination (screened and/or given)	Den	190	154	98	72	159	79	162	19	176	73	1182	4706
	Num	58	66	28	38	16	24	57	**	79	28	394	1458
	Rate	0.31	0.43	0.29	0.53	0.10	0.30	0.35	**	0.45	0.38	0.33	0.31
	SD	0.033	0.040	0.046	0.059	0.024	0.052	0.038	**	0.037	0.057	0.014	0.007
	Lower95CI*	0.240	0.350	0.196	0.412	0.054	0.202	0.278	**	0.375	0.272	0.306	0.297
	Upper95CI*	0.371	0.507	0.375	0.643	0.147	0.405	0.425	**	0.522	0.495	0.360	0.323
Blood Cultures Obtained Prior to Antibiotic	Den	241	156	135	91	249	84	191	23	208	66	1444	5765
	Num	161	117	103	83	200	54	174	**	166	48	1127	4546
	Rate	0.67	0.75	0.76	0.91	0.80	0.64	0.91	**	0.80	0.73	0.78	0.79
	SD	0.030	0.035	0.037	0.030	0.025	0.052	0.021	**	0.028	0.055	0.011	0.005
	Lower95CI*	0.609	0.682	0.691	0.854	0.754	0.540	0.871	**	0.744	0.620	0.759	0.778
	Upper95CI*	0.728	0.818	0.835	0.970	0.853	0.745	0.951	**	0.853	0.835	0.802	0.799
Time of First Dose of Antibiotic < 8hrs	Den	286	197	159	111	324	96	230	23	260	99	1785	1723
	Num	258	178	143	101	291	90	215	**	244	95	1637	1577
	Rate	0.90	0.90	0.90	0.91	0.90	0.94	0.93	**	0.94	0.96	0.92	0.92
	SD	0.018	0.021	0.024	0.027	0.017	0.025	0.016	**	0.015	0.020	0.007	0.007
	Lower95CI*	0.868	0.862	0.853	0.857	0.865	0.889	0.903	**	0.909	0.905	0.904	0.902
	Upper95CI*	0.937	0.945	0.946	0.963	0.931	0.986	0.967	**	0.968	0.985	0.930	0.928
Pne Composite Score	Den	1010	718	555	395	1071	373	818	91	915	341	6287	20553
	Num	769	572	437	343	845	282	675	67	755	274	5019	15547
	Rate	0.76	0.80	0.79	0.87	0.79	0.76	0.83	0.74	0.83	0.80	0.798	0.76
	SD	0.013	0.015	0.017	0.017	0.012	0.022	0.013	0.046	0.013	0.022	0.005	0.003
	Lower95CI*	0.735	0.767	0.753	0.835	0.765	0.712	0.799	0.646	0.801	0.761	0.788	0.751
	Upper95CI*	0.788	0.826	0.821	0.902	0.813	0.800	0.851	0.827	0.850	0.846	0.808	0.762

\* Note: 95% Confidence Intervals were calculated using the normal approximation to the binomial in situations where that assumption is valid ( $pqn > 5$ ) otherwise exact confidence intervals were calculated.

\*\* Performance rates are not displayed where denominators are less than 25

**Figure 5: Pneumonia Care**  
**How often do hospitals provide recommended care?**



This graph shows the hospital performance rate for 10 different hospitals in Rhode Island for the period May 2001 through December 2001. The hospital performance rate is the percentage of times that the hospital gave the recommended care for patients with a heart attack. A higher number is better.

\* Fifty-seven hospitals in conjunction with five state hospital associations participated in the quality measurement project for heart attack care conducted by the Joint Commission on Accreditation of Healthcare Organizations.



## How Can I Get More Information?

For more details about the clinical performance of hospitals in Rhode Island, you can request a copy of the Hospital Performance in Rhode Island: How Often Our Hospitals Provide Recommended Care for Heart Attack, Heart Failure, and Pneumonia Technical Report from the Rhode Island Department of Health by visiting their web site, [www.healthri.org](http://www.healthri.org), or by calling (401) 222-2550.

For more information about the hospitals in Rhode Island, you may contact the Hospital Association of Rhode Island by visiting their web site, [www.hari.org](http://www.hari.org), or by calling (401) 274-4274.

For more information about the law on public reporting for health care facilities contact the Rhode Island Department of Health at (401) 222-2550, or you can view it at [www.rilin.state.ri.us/Statutes/TITLE23/23-17-17/INDEX.HTM](http://www.rilin.state.ri.us/Statutes/TITLE23/23-17-17/INDEX.HTM).

For more information on the Joint Commission on Accreditation of Healthcare Organizations Pilot Project for Quality Measurement and Improvement (Core Measures), refer to their web site at [www.jcaho.org](http://www.jcaho.org).

For more information on the Joint Commission on Accreditation of Healthcare Organizations Comprehensive Review of Development and Testing for National Implementation of Hospital Core Measures, refer to their web site at [www.jcaho.org/pms/core+measures/cr\\_hos\\_cm.html](http://www.jcaho.org/pms/core+measures/cr_hos_cm.html).

For more information about patient satisfaction for hospitals in Rhode Island, you may view a detailed report at the Rhode Island Department of Health's website, [www.healthri.org/chic/performance/satisfaction.htm](http://www.healthri.org/chic/performance/satisfaction.htm).

## **Acknowledgements**

This report was prepared by Qualidigm® and Rhode Island Quality Partners and was made possible, in part, with support from the Centers for Medicare & Medicaid Services.

Many organizations helped to conduct this project. Appreciation is given to those groups and individuals who assisted in the development of this report.

### **Community Organizations & Government Agencies**

Aging 2000  
International Institute of Rhode Island  
Rhode Island Department of Health  
Urban League of Rhode Island  
Westminster Senior Center

### **Health Care Organizations**

Hospital Clinical Measures Workgroup  
Hospital Association of Rhode Island  
Joint Commission on the Accreditation of Healthcare Organizations

### **The People of Rhode Island**

More than 20 Rhode Islanders took time to participate in cognitive testing for this report.

## Definitions

CDAC	Clinical Data Abstraction Centers
CMS	Centers for Medicare & Medicaid Services
HARI	Hospital Association of Rhode Island
HCPM	Hospital Core Performance Measurement
HEALTH	Department of Health
JCAHO	Joint Commission on the Accreditation of Healthcare Organizations
NQF	National Quality Forum
PRO	Peer Review Organization
QIO	Quality Improvement Organization
RIQP	Rhode Island Quality Partners

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<sup>1</sup> Strategic Framework Board. National Forum for Health Care Quality Measurement and Reporting. October 2001, as cited at <http://www.qualityforum.org/attachment.pdf>.

<sup>2</sup> Exact two-sided 100%X (1- $\alpha$ ) confidence limits for binomial proportions ( $\alpha=.05$ ) Source: Table 41 of *Biometrika Tables for Statisticians*, 3<sup>rd</sup> edition, Volume 1, edited by E. S. Pearson & H. O. Hartley. Published for the Biometrika Trustees, Cambridge, England, 1966

<sup>3</sup> Landrum MB, Bronskill SE, Normand ST Analytic Methods for Constructing Cross-Sectional Profiles of Health Care Providers. *Health Services & Outcomes Research Methodology* 1:1 (2000): 23-47

<sup>4</sup> Jewett JJ, Hibbard JH Comprehension of quality of care indicators. *Health Care Finance Rev.* 1996;18:75:94 in Epstein AM. Public Release of Performance Data. JAMA 2000;283(14):1884-6

<sup>5</sup> McGlynn EA, Choosing and Evaluating Clinical Performance Measures, *Journal on Quality Improvement* 24: 9 470- 9

<sup>6</sup> Thomas JW, Hofer TP. Accuracy of Risk-Adjusted Mortality Rate as a Measure of Hospital Quality of Care. *Medical Care*, 1999; 37(1): 83-92.